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ABSTRACT

This paper discusses transformational change in academic libraries, as digital technology alters how services are provided, research is conducted, and learning occurs. Highlights include: advantages of libraries over the World Wide Web; redefining the knowledge management paradigm; two different types of information (i.e., explicit and tacit); a vision for online content, access, and services in the new electronic era; the challenges of managing and evaluating Web resources; the need for a search engine that focuses on Web sites, data sets, video clips, and other source material deemed to have academic value by an appropriate professional; the development of such a service as an opportunity for a commercial enterprise; the differences between cooperation, coordination, and collaboration; and the possibility for higher education to effectively partner with other not-for-profit and for-profit ventures. (Contains 20 references.) (MES)

Libraries, Knowledge Management, and Higher Education in an Electronic Environment

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By: Brian Hawkins

Proceedings

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Brian Hawkins

Libraries are experiencing the same kinds of transformational change our colleges and universities are encountering, as digital technology fundamentally alters how services are provided, research is conducted, and learning occurs. As written elsewhere, digital technology is dramatically changing the print-on-paper library model that has been the mainstay of higher education.[i] Libraries must learn to adapt by appropriately modifying, supplementing, and discarding services while maintaining the core values so important to their role at the center of the academic enterprise.

Information technology is breaching the traditional disciplinary boundaries through which the university is organized, and through which we organize and access knowledge. It has challenged and made obsolete many of our current practices of providing library services, budgeting resources, defining our student constituencies, handling tenure decisions, etc.

Libraries provide us with a clear example of both the promise and the pitfalls of new technology, the problems solved, and the problems created. The acid paper that helped fuel the spread of literacy in the mid-nineteenth century, ironically contained the seeds of its own destruction, and in the latter part of the twentieth century libraries have been faced with a massive preservation challenge. Today, digital technology presents us with a similar dilemma - the potential for greatly enhanced access combined with uncontrollable and unexpected chaos.

An example of this challenge is the mistaken impression among all too many political and academic leaders that all someone has to do is search the Web for any information one needs. A vast amount of "information" is, indeed, available on the Web today, but it is not a coherent collection of information. Further, the amount of scholarly, intellectual and aesthetic information available on the Web is truly minimal when compared with what is available in a good library.

Perhaps the greatest obstacle to moving forward in this arena is eradicating the myth that the Web already provides this library environment. Furthermore, access to the Web is anything but egalitarian. The Web is not a library, and access to it is far from egalitarian. This needs to be clearly understood before we can begin to confront the challenges and the promises the Internet holds for us.

> It is imperative that we understand the Web and the ways it is not a library. But the Web, and whatever universally available electronic information system follows it, must be reckoned with, because an ever-larger population of our world is assuming that it replaces the library. We must address all the concerns the Web raises, find ways to compensate for its lacks, and reinforce the role of the library.[ii]

Because the Web is not catalogued, no one has an idea what is there, or how this information fits into a larger taxonomy of knowledge. Instead, we have rather primitive, inelegant key-word search engines, which are neither effective nor efficient in the retrieval of information. Technology has brought about flexibility and access, but also brought about chaos to those charged with codifying and making available the information of the ages. While this was manageable in the analog world, in the digital world there is a current absence of much of the value which libraries have contributed to our society.

As noted, the Web will never contain all of the information available in a good library. The absence of copyrighted material on the Web also presents a major shortcoming. Furthermore, most of the material that is historical and that precedes copyright hasn't been digitized, and there are not systematic efforts going on to address this. Although some individual libraries have programs to digitize some of this material and include it in their own collections, these efforts represent a duplicative and non-comprehensive approach.

The Web lacks standards and methods to validate or authenticate information. There is no librarian making informed decisions about the quality or appropriateness of the information and then adding this to a coherent collection. With the web, everything is equally valid (or not) and there are no filters. However, the Web is an outstanding example of the power of digital technology to provide widespread access to information. These challenges are made clear in a crisp and elegant manner by James O'Donnell as he states:

> " - in one important regard, the Internet is not a library: nobody built it. There is great value in the diversity and abundance of information out there, and one may reasonably expect that diversity and abundance to continue to explode. But the qualities that make the library valuable are not quite there yet. There is no organized cataloging, there is no commitment to preservation, there is no support system to help you find the difficult or missing resource. Finally, there is no filter: that is, there is none of the sense that a user of a great library has that somebody has thought about the possibilities and selected a set of materials to be both comprehensive and yet delimited. On the internet, you never know what you're missing."[iii]

While the Internet promises vast amounts of information available in an almost ubiquitous fashion, many of the basic defining characteristics of a library are missing. These missing elements will significantly retard the educational framework for our society. Libraries must be part of the fabric of the new electronic infrastructure that is emerging. Access to the content, the services, and the organisation of information is essential to teaching, learning, and inquiry at all levels of our educational systems, as well as to the society at large.

Knowledge Management

In recent years, a new phrase - knowledge management - has entered the lexicon. For many in the academic world, this is an old concept, a function historically performed by librarians. However, in the digital information age this term has taken on nuances that point to the need to rethink the old paradigms; to reconsider who the new knowledge management players in the academy might be. According to the experts in this field,

> Knowledge management is the process of transforming information and intellectual assets into enduring value. It connects people with the knowledge that they need to take action, when they need it. In the corporate

> sector, managing knowledge is considered key to achieving breakthrough competitive advantage.[iv]

The key to knowledge management is capturing the knowledge of process - how organisations get their work done - and how various elements of information connect to this. The literature defines two different types of information necessary to accomplish this: explicit and tacit. Explicit information is packaged, easily codified, transferable, and communicable. Tacit knowledge, on the other hand, is personal, context-specific, difficult to formalize, and difficult to communicate and transfer.[v]

Combining these two types of information - using formal and informal information to guide processes - provides the perceived value of knowledge management. The focus is on unraveling individual know-how and applying it to explicitly driven processes so that the right knowledge is available to the right people at the right time.[vi] These interesting concepts are being applied in limited and often modest scale in industrial settings. The commercial world hopes to capture efficiencies knowledge management promises in order to gain competitive market advantage. The knowledge management paradigm has even been referred to as the next "killer application" in that it provides organisations with valuable, credible, and insightful information - a tremendous asset and a unique advantage.[vii] Already companies are generating databases, linkages on web sites, and portals to facilitate the integration of explicit and tacit information, and attempting to gain this advantage. So, the question we might address is whether this paradigm is applicable to higher education, and if so, how it might be applied.

Our academic libraries have focused quite effectively on collecting, organizing and making explicit information/knowledge available. The Web adds an entirely new dimension, however. Explicit information is much more difficult to acquire because of the explosive, bottom-up nature of the Web, and tacit information is equally or perhaps more difficult to obtain because it is buried in web-based links to other sites, databases, and publications. In academia, most of the tacit knowledge associated with an area of study lies with the faculty who study it. The tacit knowledge of a literature may be what characterizes much of the informal, side-conversations at academic conferences, in discussions between graduate students and their mentors, etc. It is precisely this type of knowledge that Brown and Duguid describe so eloquently as they talk about the value-added dimension of an academic community.[viii][ix] However, this information has always been informal, word-of-mouth, and not the province of the library or any other organisational unit. However, in commenting on knowledge management in the university context, Cronin and Davenport suggest that this informal knowledge can be captured by creating a space, and reconstituting the academic village, so that both explicit and tacit information can be combined and shared by faculty.

> The challenge is to design a customized, yet flexible infrastructure that supports both individual and collective learning so the organisation, whether a corporation of a university, can adapt to discontinuous change in its operating environment.[x]

The academic community has been collecting tacit information for years. It has been known as marginalia or annotation, it has taken the form of bookmarks (either physical or electronic), and it most recently has manifested itself in the form of hot-links that connect related Web sites. This tacit information is what one person argued was so valuable as the scribblings and notes that one once found on the backs of the physical cards one used in a library card catalog.[xi] However, for the most part, these have been "tools" or "aids" that are created by the individual, and this information is not systematized, and certainly not available to a broader community. We have already encountered the challenges associated with determining whether linkages are authoritative and legitimate in scholarly inquiry, and unleashing all of these other types of tacit knowledge seems massive, unwieldy, and overwhelming. Why would one even think of such absurdity? The answer lies in the potential increased productivity and innovation that might arise if this information were somehow integrated into the processes of scholarly inquiry. It seems to be this thought that causes Peter Lyman to suggest that higher education is addressing the wrong problem when he states:

> The problem is not how to digitize libraries to deliver information to the desktop and laboratory; the problem is how to create flexible organisations that reach beyond the boundaries of the physical campus.[xii]

Knowledge management in an academic setting must encompass the community of scholars in a given discipline and must be able to integrate publications, data sets, tools for manipulating such data, connections to databases of pictures and images, and much more. Portal technology is being used by corporations to bring together tacit and explicit information in a "push" technology framework. This also should have potential in an academic environment because its ability to help us screen and filter information, to hone in on explicit meanings, and to effectively "push" this filtered information to users. Jerry Campbell has described the nature of the content, the services, the engines and the tools that might theoretically be included in such a "scholar's portal."[xiii]

Much of the focus of knowledge management literature is on competitive advantage, enabling one firm to have a leveraged position over another. In the academic world, however, collegial rather than competitive motivations change the nature and the dynamics of a knowledge management model. While most certainly, the "bragging rights" of having a larger or more comprehensive research library have been used "competitively to try to attract better faculty, for the most part, the culture of the academy is based upon the free flow of information, without competitive concerns.

> Typical knowledge management strategies for business stress the processes of capturing, exploiting, and protecting institutional expertise. - The situation is different for universities, however. Here, the construction of knowledge draws upon an established set of open practices: the scholarly communication system. At the heart of this process lies peer review. When scholars vet their work for publication, they strive to have their ideas as widely disseminated, discussed, and used as possible, including in the classroom, within their disciplinary communities, and in the public sphere. Consulting firms may not routinely broadcast and share information, but these activities are second nature within the academy.[xiv]

So if we are to envision a different set of library resources, perhaps including a knowledge management dimension, what might this look like, and more importantly how might this be created, and by whom? These are some of the questions and challenges facing academic leaders, librarians and scholars as we enter into this new age of information, and as we attempt to transform our organisations.

A Vision

With this discussion of knowledge management and the impact that technology is having on libraries, it is perhaps worthwhile to try to define what precisely it is that we strive for, aspire to, or dream of with regard to online content, access and services in this new electronic era. The vision must include a guarantee of universal electronic access to the collective corpus of our traditional libraries, as well as the inclusion of Web-based materials and other kinds of tacit information already discussed. Another difference is that this

access could be available to anyone, not just a chosen few who have access to materials as a function of geography or status.

> **The dream to which we need to aspire is that all scholarly and research publications (including university, governmental, research, and museum sites) be universally available on the Internet in perpetuity.**

It is worth dissecting this statement to make sure that all of the elements are understood. Like all dreams, it may never be completely realized, but the goal should be understood. To try and capture 'all' scholarly and research materials is a mammoth - and na&iumlaut;ve if not impossible - task. However, it is important to try to maximize these materials via a single access point so that the power of electronic search engines, in combination with as complete a collection as possible, might result in full text retrieval of the knowledge of the time. This means more than just scholarly journals. It means access to historical and special collections, to other types of research output, to databases, to museum archives, to governmental data and publications - anything that might have intellectual or academic interest in the future. But it also means a new electronic corpus of information, and it implies that appropriate description and validation of content has occurred.

This dream emphasizes that these resources 'be universally available.' This means that they could be accessed via the Internet, at any time and from any place. This phrase was carefully chosen to emphasize access, but leaving open the issue of cost. These resources first and foremost need to be available. Access may be free, licensed, or available through micro-payments. There are many different economic models and potential players that will have to be included if this dream has any chance of becoming a reality.[xv]

Finally, the dream suggests that these resources be available in perpetuity. This phrase emphasizes the need for a strategy of preserving these resources over the ages. While the challenges of "acid paper" continue to plague librarians of traditional collections, they pale in the light of the challenges of preserving these new digital collections. As a dream of creating a set of library resources that will support education and scholarship in an electronic era, the development and implementation of a coherent plan for preserving these resources is essential. Unfortunately, in our current milieu, this function has largely gone ignored, and knowledge is being lost as a result.

This dream, although articulated in a slightly different fashion, is not particularly new or original. During a series of meetings held in 1994, chief academic officers and librarians from many of our greatest institutions of higher education gathered to share their thoughts on the future of research libraries. Most envisioned a future with universal access, by students and faculty, to information in all possible media via a single, multifunction workstation. This vision was shared by our universities' technology leaders, as well as by many faculty who anticipate new and exciting methods of instruction allowing students to integrate the knowledge of the ages. However, these conferences also found another commonality - "that of not having any plan or vision on how we might achieve this dream and get from here to there!"

There still is no plan on how to get there, and the scope and enormity of the set of tasks involved are so daunting, the common reaction seems to be to wring one's hands, affirm the dream, and hope that someone else will address this critical problem. Developing a plan - or more aptly, a set of plans - to address these critical issues is necessary. Achievement of this dream includes a number of major efforts, each of which would need to be systematically explored, and addressed to cope with the transformative changes affecting the university, the academic library, and the world of scholarly inquiry. For the sake of example, let us take the issues of knowledge management and the new challenges of describing and validating content, and make an initial attempt to define some of the missing elements and to define courses of action that might lead to the fulfillment of the dream in this one arena.

Current Challenges and a Possible Direction

In the print-only world, there has been a complex but well-defined system of content validation and description that involves librarians, referees, reviewers and publishers. After going through the various defined processes, its selection gave that material a legitimacy that students and scholars came to depend upon. Furthermore, technological advances and collaborative efforts have allowed the costs of this process to be reduced through shared electronic cataloging (e.g. OCLC) and through the purchase or licensing of abstracting and indexing electronic databases. Librarians recognized ages ago that the only scalable and affordable approach to such processes was to take advantage of leveraged and shared resources.

The rise of electronic information resources freely accessible through the Internet has disrupted this relatively efficient system in a number of ways. There is no clear and defined role for libraries with regard to the selection, preservation and provision of access in regard to the digital resources accessible through the net. Additionally, students and faculty have a need to learn how to evaluate these new information resources, and it is far more difficult to do so on the Web than it has been in a traditional library. With a traditional library, the very fact that a book or a journal was held by a library represented a conscious set of decisions about the validity of the information, and implied a filtering process that suggested a reasonable level of legitimacy. This is not true when one surfs the Web. Another problem is that of scale, as some libraries, academic departments, and even individual scholars are creating their own collections of Web sites, selecting and describing network resources they find useful and credible. In some cases these resources are even added to centralized databases, but the combination of the growth of the web, and the lack of scalability of these individual, highly labor intensive approaches do not make such efforts a viable or affordable means of addressing this important challenge. There is some hope on the horizon in dealing with some of these issues, as there are some newly emerging, shared (and hence leveraged) cataloging resources such as OCLC's Cooperative Online Resource Catalogue (CORC) project, and the subject gateways being established by the ROADS project in the UK.

Currently, scholars trying to thoroughly research an area have to go to a library to do the traditional search process and then do an electronic search of the web and other electronic resources. This also implies that these people doing this searching have the ability to discern the quality, authenticity and validity of the information that they find on the web. Of greatest concern, is that a student might go just to the Web, either assuming that the information available there is complete and accurate, or assuming that the Web alone provides an adequate search. There is plenty of reason to believe that students today and in the future will fall into this trap, because their preferred method of working is to do everything online. While everything possible should be done to educate students and others that each of these two different approaches has its own respective merits, it is unrealistic to think that such educational efforts will be successful with the vast majority of students who have grown up with the Web.

Another problem with the Web today is the nature of the various search engines such as Yahoo! and Altavista. While such services offer far wider coverage than any traditional cataloging approach can possibly match, they do so with far less quality, filtering and a very different, often less powerful, level of description. A search using one of these engines may yield a half million or more hits. These search engines are also tainted by a bias in the selection process rooted in their commercial advertising relationships, rather

than solely on the search parameters. Most users don't use or know how to use their advanced features and the more sophisticated search algorithms embedded in these highly used applications. Consequently, they search virtually the entire web. In summary, in the current environment and with the current tools, we are left with incomplete information, little if any organisation, and rudimentary, inefficient and often inaccurate searching. The current electronic environment, however, does offer the advantage of being able to provide an interesting set of "reference" services, such as those found on Amazon.com, offering reviews and related or recommended materials in association with the material for which the user was searching. These services are increasingly being perceived as a value to scholars, and academic libraries need to think through the relationship between their own service offerings and these other commercial services.

If we return to the notion of "the dream" mentioned earlier, we find ourselves conceiving of a system of a selected set of academically viable resources, with some validation of the authenticity of the content, and for which students and faculty would be provided with a more legitimate process for selecting and finding information. In the print-on-paper world, this filtering has been provided by our libraries. Librarians have made selections of legitimate works, thus freeing this responsibility from end users. The broader higher education community can continue to depend upon the presently available search engines with their associated limitations, or a new point of entree can be developed, i.e. a portal with selected sources, better search tools, and a validated set of resources. Such a portal could address many of the problems and limitations already discussed by providing an appropriate inventory of resources, necessary descriptors, and an associated search engine.

Ideally, a search engine is needed that focuses exclusively on Web sites, data sets, video clips, and other source material deemed to have academic value by an appropriate professional. These materials need to be collected and brought together, through the use of a common interface, a concept similar to the one being employed by the OCLC CORC project. The hundreds of thousands of web sites that presently "feed" our current search engines need to be filtered, identifying those that have legitimate value and including them for preservation in much the same way that a traditional library collection is assembled. Such a sophisticated search engine would provide complex Boolean logic and search algorithms that are the equivalent of modern library search engines. Over the long term, this process should develop a collection with the same degree of "reasonable completeness" associated with a good library.

A second requirement for such an engine includes the development and application of systematic standards in the definition of metadata, cross reference information, and other important identifiers necessary to do more complex searching. In essence, what is needed is a dynamic MARC record, and a set of cataloging protocols and agreed upon conventions necessary for the description and identification of information in any number of media.

In dreaming about what such a search engine might do, it is important to simultaneously consider who might use such a set of tools, so that a practical plan can be developed. The potential market for this service could be quite large, and go well beyond the higher education community. Most assuredly, it would include college students, faculty and staff. It would also include the world of research professionals outside of higher education, (including research institutes, corporate research and development professionals); those involved with cultural heritage organisations, such as museums and galleries; and workers in government, public libraries, and the public schools. Members of the general population who want to use the Internet to obtain more sophisticated information might also be included. This latter group can perhaps be stereotyped by the category of people who read the New York Times book review, or who want to actively help their children do better in school, etc.

If the market for such a set of services goes well beyond research universities, or even the higher education community, then it is fair to assume such services might present a viable opportunity for a commercial enterprise. An existing or new company with the necessary seed capital and business acumen to develop such an effort might provide a much better and more long-term solution, than would yet another fragmented approach by higher education. Importantly, such a "private" approach could spread the costs of the project over a much larger audience, hence reducing the unit cost that would be needed if this were just a higher education enterprise.

Advertising could provide a significant source of revenue to support such an effort. The market for these services - educated, upwardly mobile - is highly sought after. By attracting a large number of these well-educated "eyes" to a particular site, the objective of many very successful portals today. If this were not found to be objectionable by many of the purists who inhabit this marketplace, it is even possible that these services could be made available for a nominal or even non-existent price.

A not-for-profit corporation run in concert with a number of higher education institutions or associations, or a private, commercial enterprise in concert with members of the academic community offer two models for such an initiative. In either case, it needs to be operated as an actual business, involving professionals in the areas of management and marketing so that an efficient business operation can be established. This "business" approach is in contrast to the all-too-common history of projects that have been run ineffectively by individual campuses. This "business" approach also would to assure that this effort could be sustained over the long term. To the degree possible, the first exploration of alternatives should reside with partners that have proven track records of working collaboratively with higher education, such as OCLC.

The creation of such a "business" would require some significant seed capital to begin the collection and cataloging of the information sources. This effort would be a very large undertaking, and would require a sizeable number of qualified librarians and other professionals. Venture capital might be raised from traditional sources, or a group of well-endowed universities might provide the seed money and be stakeholders in the enterprise. The "product" that is developed could either be purchased or licensed directly by an end user, or it might be licensed to another portal company to add value to the partner portal site, thus providing an additional income stream.

Such a portal also would provide access to the tacit information discussed earlier in relation to knowledge management.. Referrals and reviews such as those provided by Amazon.com could provide a significant added dimension. Web-based information could be screened and informative links to other sites, critiques, reviews, and related information could be included. If this capacity existed technically, it would be possible for communities of interest to emerge in specific disciplinary areas, thus enlarging and codifying the tacit information that experts in the area of knowledge management argue is so essential.

However, such a vision implies that those responsible for this new environment include, but go beyond the library community. It implies the active involvement of faculty and scholars in many different areas of study. In an ideal world, the organisation responsible for creating this environment would develop collaborative relationships with the academic community in higher education. To the degree that institutions, libraries and faculty co-operated with this group, the larger the collection would become, and the sooner it would become truly viable. In terms of the cataloging for example, once appropriate and acceptable standards were defined, the cataloging could be pushed "down-stream" and shared in much the fashion that the cataloging of books is presently done.

In discussing knowledge management in a higher education setting, Peter Lyman emphasizes several dimensions of infrastructure that would be required to make this new kind of educational e-commerce actually work. He then goes on to say that:

> This infrastructure, of course, is only a means; the more difficult problem is the discovery that strategic problems require collaborative solutions and the will to innovate.[xvi]

This point cannot be emphasized strongly enough, although this ability to truly collaborate is perhaps one of the greatest challenges (and weaknesses!) facing higher education today.

Collaboration

In an article totally unrelated to higher education, Andrea Youngdahl describes and makes distinctions between three concepts that are all too often used synonymously. She suggests there are fundamental differences between co-operation, co-ordination, and collaboration.[xvii] These three levels of involvement present an important challenge to the manner in which institutions of higher education interact with one another. She suggests that co-operation is an informal - often superficial - level of co-operation. It involves information sharing, serving on committees together, and yet allowing the participants to fundamentally stay separate and to continue to function an a completely autonomous manner. Co-ordination, she describes as having a more mutual level of commitment. Co-ordination involves actual resource sharing, filling in the gaps that the participants would not be able to accommodate individually, and adapting and accommodating differences in order to achieve a goal. Finally, she focuses on collaboration which she suggests involves a synergistic - not an additive - solution. This collaborative model requires the actual commitment and investment of resources, based on a shared vision. Collaboration is not competitive, but rather a new formulation that creates a new community. It is precisely this new kind of collaboration that institutions of higher education need to adopt if they are to be viable in the future, and it is this kind of collaboration that has been suggested in addressing some of critical library problems earlier in this paper.

Many colleges and universities are attempting to develop their own distributed learning environments. Yet the cost and complexity of such stand-alone structures - along with the very real challenge that academic institutions lack the necessary nimbleness, flexibility and responsiveness needed in order to be competitive - will almost certainly serve as a significant barrier to individualized solutions. Collaboration among institutions will become increasingly essential. So far, few entrants have attempted to develop a broad-ranging curriculum that would qualify as a liberal arts education. For this reason, collective action and other consortial efforts drawing on faculty and resources from many institutions will likely be the most successful models. This same pattern is likely to require collaboration in issues related to operations, student services, support structures, etc.

Those in higher education have long assumed that not-for-profit educational efforts result in a higher-quality product than commercial efforts. Yet institutions need to throw off their defensiveness, question this assumption, and embrace the fact that partnerships between and among for-profit and traditional institutions may be some of the most successful models for creating and delivering these new learning environments.

Higher education regularly backs away from collaborative relationships for a range of traditional reasons: institutional pride; the "not invented here" syndrome; the pursuit of control (no matter how illusory that concept has become!); the steadfast opinion that "my campus is unique; and the wistful desire for the way things used to be. Up until now, we have unfortunately approached collaboration as something we did (or should do) after we got done doing our primary business. In essence we thought of collaboration as an avocational approach. The challenges that we face today with the speed of change, and the transformations that are overtaking us, call for us to firmly come to grips with the notion that collaboration is the only means of competitive survival.

Can higher education learn to effectively "partner" with other not-for-profit and with for-profit ventures? Its track record so far is not good. Effective online learning models will rely heavily on collaboration with external entities, as will any solutions to effectively deal with libraries and sharing information resources electronically. If higher education develops that ability, new opportunities and new leveraging will result, increasing the likelihood of success. Yet the jury is still out on whether our institutions can develop these skills. We may continue to bungle along in a "go-it-alone" mode as we have in the past - all to our collective long-term detriment. In this new networked world in which we live, collaboration is a common theme that will need to be embraced!

Conclusion

As William Plater said in his essay, The Labyrinth of the Wide World, "More than any other traditional asset, the library is the means by which American universities will transform themselves into something entirely new."[xviii] The discussion in this paper focuses not on just what might be, but how we might go about inventing a part of the future and part of the "something entirely new" to which Plater refers. This is a key part of understanding and providing for our consumer's needs, be they students or faculty. The community needs to keep its collective eye on the objective, that of making the dream that was described earlier in this paper come true, namely that of having intellectual and aesthetic information easily available via the network and preserved for the digital age. However, at the same time, the process of getting there will be fraught with obstacles.

> Ironically, the strongest barriers to creating an affordable and efficient array of digital information resources are the existing organisational and financial structures that have created and supported the development of our internationally admired higher education system.[xix]

This new conceptualization of the library, of the information resource environment, and of the university itself are all works in progress. All of this implies new kinds of information, new structures, the breaking down of the old stovepipes that characterize our organisational structures, and new forms of collaboration. The discussion in this paper attempted to identify some of the trends and a possible direction that might be pursued to address one of the five major barriers to achieving the dream that was identified. Jim Duderstadt, the former president of the University of Michigan captures the challenge before us with great erudition, as he states:

> " - the real question is not whether higher education will be transformed, but rather how - and by whom. If the university is capable of transforming itself to respond to the needs of a culture of learning, then what is currently perceived as the challenge of change may, in fact, become the opportunity for an age of enlightenment in higher education for the years ahead.[xx]

We all need to become active participants in defining this new transformed environment, but that will only occur if we can reach out

across the boundaries of our own institutions, across the oceans, and across other artificial boundaries that inhibit an active community of scholars supporting each other. It will only occur if we have courage enough to utilize new business models and to participate with new partners in this process. Only though a new spirit of collaboration can we successfully adapt to the transformative change that surrounds us in this new digital era.

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